Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 12(4): 1931, 20 July 2016 doi: http://dx.doi.org/10.15560/12.4.1931
ISSN 1809-127X © 2016 Check List and Authors

New records and an update of the distribution of *Sibon annulatus* (Colubridae: Dipsadinae: Dipsadini) for Colombia

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Abstract: We revised and identified preserved specimens of *Sibon annulatus* (Günther, 1872) to present an update of its geographical distribution in Colombia. We include three new records of this species, which expand its distribution within Colombia to the departments of Chocó and Santander.

Key words: Neotropics; range extension; snail-eating snake; Chocó-Magdalena province

"Snail-eating snakes" is used to refer to the snakes of the genera *Dipsas* (Laurenti, 1768), *Plesiodipsas* (Harvey et al. 2008), *Sibon* (Fitzinger, 1826), *Sibynomorphus* (Fitzinger, 1843), and *Tropidodipsas* (Günther, 1858). These genera, nested within the Tribe Dipsadini (sensu Zaher 2014), are well-defined by their morphological and behavioral characteristics. Moreover, recent research has provided new evidence supporting the monophyly of this tribe within the subfamily Dipsadinae (Grazziotin et al. 2012; Zaher et al. 2009, 2014). Snakes of the genus *Sibon* are molluscivorous specialists that feed mainly on slugs and snails (Savitzky 1974; Cadle 1984). Sixteen species are currently recognized (Uetz and Hošek 2015) that inhabit lowlands and premontane zones from Mexico to northern South America, including the Pacific versant of Colombia and Ecuador, Atlantic drainages of Colombia, Venezuela, the Guianas, adjacent Brazil, and upper Amazonian drainage in Ecuador (Wallach 1995; Savage 2002). In Colombia, there are records of two species, *Sibon nebulatus* (Linnaeus, 1758), in the three branches of the Andes cordillera and the Sierra Nevada de Santa Marta below 2,630 m (Peters 1960; Pérez-Santos and Moreno 1988) and *Sibon annulatus* (Günther, 1872), known only from a single specimen from Alto de la Paz, municipality of San Martin, department of Cesar at 1,402 m elevation (Moreno-Arias 2010). Herein, we update the geographical distribution of *S. annulatus* in Colombia, adding new locality records based on specimens deposited in scientific collections.

We examined preserved specimens from the collections of ICN (Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Cundinamarca); UTCH (Colección Científica de Referencia Zoológica del Chocó-Herpetología de la Universidad Tecnológica del Chocó "Diego Luis Córdoba") and UIS (Colección de Herpetología, Universidad Industrial de Santander, Bucaramanga, Santander). Literature records and mu- seum databases with precise localities from South America are also included in the map (Figure 1). Species identification was based on literature and taxonomic keys (Kofron 1985; Savage 2002; McCranie 2007; Köhler et al. 2010; Rovito 2012; Lotzkat 2014).

Records of *Sibon annulatus* from Colombia consist of three unpublished museum reports and one published report (Table 1): ICN-10834, an adult male from San José del Palmar, Chocó (04.968406° N, 076.227597° W; 1,500 m), 8 June 1988; UTCH COLZOOCH-H 0792, an adult male from the margin of a stream in a gallery forest at El Afirmado, municipality of Pie de Pato, Chocó (05.64194°N, 077.0755°W; 320 m), 6 March 2005; UIS-R-2796, an adult male from the foothills of the Serranía de los Yariguies at La Colorada, municipality of San Vicente de Chucurí, Santander (06.792548°N, 073.479595°W; 1,420 m), 31 October 2014. Additionally, an adult male, ICN-12020, was reported from San

Martín, Cesar, (07.956254° N, 073.348031° W; 1,402 m) (Moreno-Arias 2010) (Figure 1; Table A1)

Sibon annulatus (Figure 2) can be distinguished from the sympatric species *S. nebulatus* by the lack of contact between the first infralabials posterior to the mental region and by the clearly distinguishable coloration pattern which in *S. nebulatus* is mainly composed of grey or black tones.

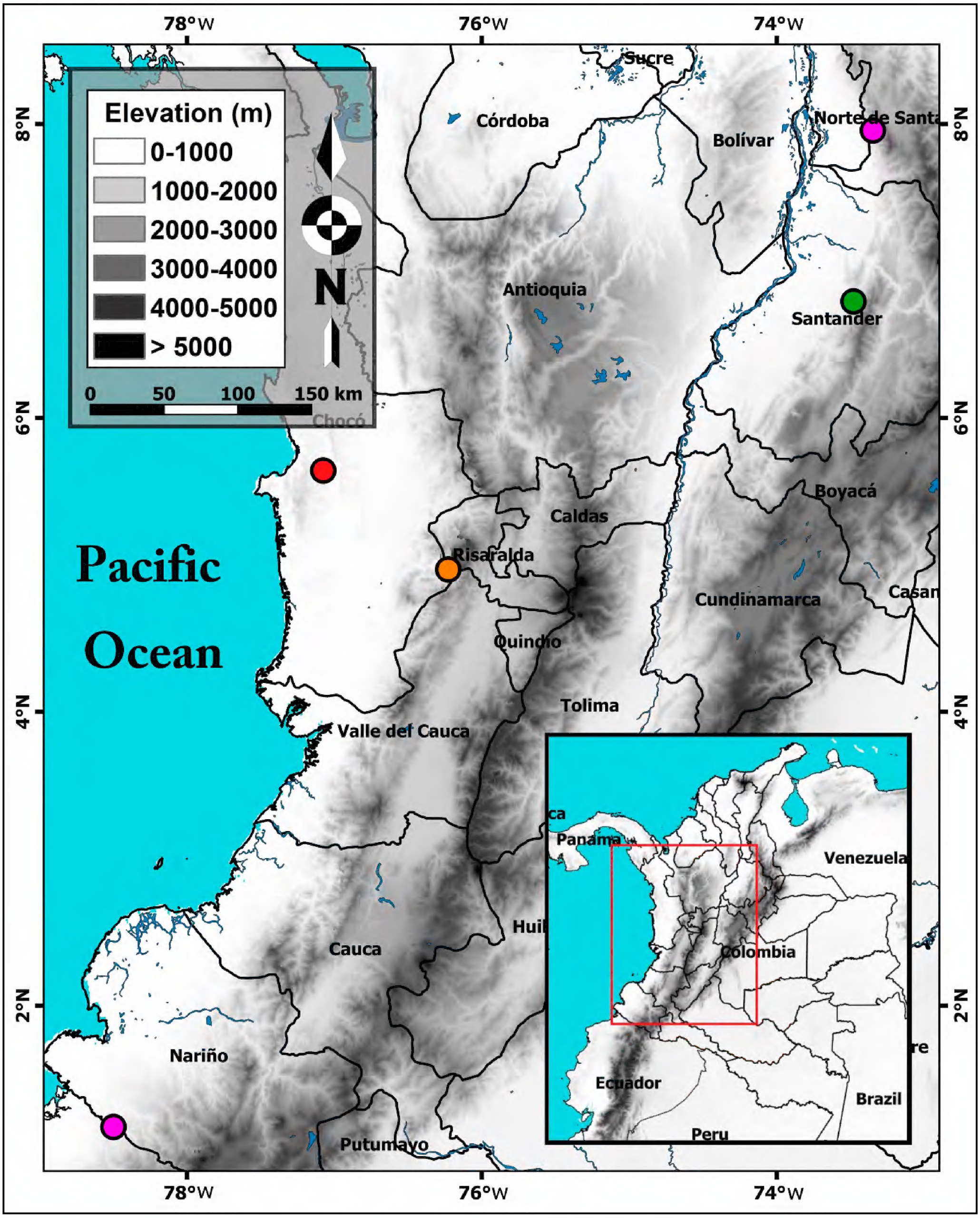

Figure 1. Current distribution of *Sibon annulatus* in Colombia, showing previously known (Violet circles) and new records (Green: UIS-R-2796; Orange: ICN-10834; Red: COLZOOCH-H 0792), datum WGS84.

Table 1. Morphological data of the specimens of *Sibon annulatus* examined in this work. A stroke (/) is used when the counts from left/right sides are different; number of supralabials (numbers in parentheses = supralabials in contact with eye); number of infralabials (numbers in parentheses = number of infralabials in contact with anterior chin-shields); *Tant* and *Tpost* account for anterior and posterior temporals respectively. The rightmost column (Lotzkat 2014*) contains data from males of *Sibon annulatus* populations in Lower Central America (Costa Rica and Panama). Values from examined specimens that expand the hitherto documented variation are in **bold** font, imperfect values owing to incomplete tails are in *italics*.

	Sibon annulatus				
	ICN-10834	**ICN-12020**	**UIS-R-2796**	**COLZOOCH-H 0792**	**Lotzkat 2014***
Sex	male	male	male	male	male
TL (mm)	632	686	**733**	570	648
Dorsals	15–15–15	15–15–15	15–15–15	15–15–15	15–15–15
Preventrals	2	1	—	1	—
Ventrals	186	187	**197**	187	170–193
Subcaudals	**104**	110	115	*80*	108–133
Supralabials	7(4–5)	7(4–5)	8(5–6)	8(5–6)	6–9
Infralabials	9(1–6)	9(1–6)	10(1–7)/8(1–6)	9(1–6)	6–10
Tant	1	1	1	1	1–2
Tpost	2	2	2/3	2	1–3
Postoculars	1/2	2	2	2	0–3
Preocular	Absent	Absent	Absent	Absent	Absent
Loreal-eye	Contact	Contact	Contact	Contact	Contact
Postmentals	2	2	2	2	1–2

For each of the four specimens we recorded (1) coloration patterns, (2) the number of ventral scales, (3) the number of subcaudal scales, (4) the organization of the labial scales, (5) the number of postmental scales, (6) total length (Table 1). This is compared to data for Central American populations of *S. annulatus* (Lotzkat 2014). Colombian populations are characterized by dorsal coloration consisting of 41 to 45 irregular red bands with greenish to white interspaces not wider than the bands; ventrals 186–197; subcaudals 104–115; upper labials 7(4–5) or 8(5–6); lower labials 9(1–6); 10(1–7) or 8(1–6); postmental divided. One of the Colombian specimens (UIS-R-2796), measured 733 mm (total length), greater than any total length reported (Lewis et al. 2010).

The three new records presented in this work expand the known distribution of *S. annulatus,* which now extends from Honduras to the biogeographic province of Chocó-Magdalena and the western slope of the Cordillera Oriental in Colombia (Figure 1), with an elevational distribution between 300 (Yánez-Muñoz et al. 2009; Ortega-Andrade et al. 2010) and 1,500 m above sea level (this work).

Figure 2. *Sibon annulatus*. Male adult (TL = 733 mm; UIS-R 2796) from La Colorada, San Vicente de Chucurí (Santander, Colombia). Photo: Elson Meneses-Pelayo.

This species is catalogued by the IUCN as Least Concern (LC) considering, among other factors, its wide distribution and lack of any obvious threats. However, this assessment does not consider the South American populations treated in this work. With this in mind, we believe it is necessary to reevaluate the threat category of *S. annulatus* taking in consideration the possibility of previously unknown local threats.

ACKNOWLEDGEMENTS

Financial support for this work was partially provided by the Asociación Colombiana de Herpetología (ACH), and we thank Vivian Paez and her "Botas al Campo" initiative for the financial support they gave to this work. We would like to thank Martha Patricia Ramírez Pinilla and Paola Sánchez for their revisions and suggestions to the text. Also we thank the curators of the ICN and the UTCH: Diego Luis Córdoba collections for granting us access to their specimens. We are deeply grateful to Sebastian Lotzkat, Todd R. Lewis and Ross MacCulloch for their valuable comments. Our thanks go to Pablo Palacios, Omar León, José Pinzón and Daniel Calero for their help on our field expeditions.

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Author contribution: EMP wrote the text, revised specimens, and made the figures and tables, JDBS wrote the text and revised literature; JRCP identified specimens and revised the text; JDER, PPR and JTRM revised one specimen and helped collecting the data.

Received: 1 May 2016
Accepted: 28 June 2016
Academic editor: Ross MacCulloch

APPENDIX

Table A1. Full list of the occurrence localities of *Sibon annulatus* in Colombia, based on literature and museum data.

Specimen	Department	Municipality, locality	Latitude	Longitude	Elevation (m)	Source
ICN-10834	Chocó	San José del Palmar	04.9684	-076.2275	1,500	ICN
ICN-12020	Cesar	Alto de la Paz	07.9562	-073.3480	1,402	Moreno-Arias (2010)
UIS-R-2796	Santander	San Vicente de Chucurí, Vda. La Colorada	06.7925	-073.4795	1,420	MHN-UIS
COLZOOCH-H 0792	Chocó	Pie de Pato, El Afirmado	05.6419	-077.0755	320	COLZOOCH-H